THE CLAIMS

What is claimed is:

1. A method for producing a film of silver-containing material on a substrate, comprising:

depositing an amorphous film comprising at least one silver-containing precursor material on a surface of a substrate; and

irradiating the amorphous film to produce an irradiated film comprising elemental silver.

2. The method of claim 1 wherein the elemental silver film is substantially conductive.

3. The method of claim 1 wherein the irradiated film further comprises silver oxide.

4. The method of claim 3 wherein the silver oxide film is substantially a semiconductor.

5. The method of claim 1 wherein the irradiating comprises irradiating the film with electromagnetic radiation.

6. The method of claim 1 wherein the irradiating comprises irradiating the film with ultraviolet light.

7. The method of claim 1 wherein the irradiating comprises irradiating the film with laser light.

8. The method of claim 1 wherein the irradiating causes a substantially thermal reaction in the film.

9. The method of claim 1 wherein the irradiating comprises photolysis.

10. The method of claim 1 wherein the irradiating comprises irradiating the film with visible light.

11. The method of claim 1 wherein the irradiating comprises irradiating the film with an ion beam.

12. The method of claim 1 wherein the irradiating comprises irradiating the film with an electron beam.

13. The method of claim 1 further comprising reducing the elemental silver and silver oxide after irradiating.

14. The method of claim 1 wherein the irradiating is done in a controlled atmosphere.

15. The method of claim 13 wherein the controlled atmosphere comprises nitrogen.

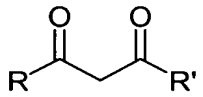
16. The method of claim 13 wherein the controlled atmosphere comprises a vacuum.

17. The method of claim 13 wherein the controlled atmosphere comprises air.

18. The method of claim 16 wherein the controlled atmosphere further comprises water.

19. The method of claim 1 further comprising removing remaining unirradiated silver-containing precursor material from the substrate.

20. The method of claim 1 wherein the silver-containing precursor comprises silver complexed with at least one ligand, said ligand comprising:



wherein R and R' are each independently selected from C_nH_m and $C_nH_mA_xB_y$, wherein n, m, x and y are integers, and wherein A and B each independently comprise in-chain, terminal or pendant functional groups.

21. The method of claim 1 wherein the silver-containing precursor comprises silver (I) hexafluoroacetate tetraglyme.

22. The method of claim 1 wherein the silver-containing precursor comprises silver (I) trifluoroacetylacetonate.

23. The method of claim 1 wherein the silver-containing precursor comprises silver hexafluoroacetylacetonate.

24. The method of claim 1 wherein the silver-containing precursor comprises silveracetylacetonate.

25. The method of claim 1 further comprising covering the amorphous film with a mask that leaves a patterned area exposed.

26. A method for making a pattern of a silver-containing precursor on a substrate, comprising:

depositing an amorphous film comprising a silver-containing precursor on a surface of a substrate; and

irradiating the amorphous film using a patterning means to produce a patterned irradiated film comprising elemental silver and silver oxide.

27. The method of claim 25 wherein the silver-containing precursor material is selected from the group consisting of silver (I) hexafluoroacetate tetraglyme, silver (I) trifluoroacetylacetonate, silver hexafluoroacetylacetonate, silveracetylacetonate, and combinations thereof.

28. The method of claim 25 wherein unirradiated silver complex is subjected to heating, the heating converting the unirradiated silver complex into a film comprising silver oxide.

29. The method of claims 1 or 25, wherein the elemental silver and silver oxide film is heated in an atmosphere comprising hydrogen.

30. The method of claim 25 further comprising removing unirradiated silver-containing precursor after irradiating.